

Remarks

The following remarks are provided in further support of the Claims.

Rejections

Rejection Under 35 U.S.C. §103(a)

Claims 1-7, 10, 12-13, and 15-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Carr et al. (PCS ELITE – A Complete Die Compaction Software Package”) in view of Applicants' Own Admission (specification page 4, lines 3-4, page 5, line 17).

Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Carr et al. (PCS ELITE – A Complete Die Compaction Software Package”) in view of Applicants' Own Admission (specification page 4, lines 3-4, page 5, line 17, and further in view of Zipse, 1997).

I. DISCUSSION (Rejection Under 35 USC 103(a), Carr et al. in view of Applicant's own admission, Specification, page 4, lines 3-4 and page 5, line 17).

A significant difference between Carr et al. and the present invention, as described in claims 1-7, 10, 12-13, and 15-17, is that the simulation model of Carr et al. utilize as basic building blocks the "geometries ... such as vertices, lines, and arcs", as noted by the Examiner in Section 5 of the Detailed Action, while the method of the present invention in Claims 1-7, 10, 12-13, and 15-17 specifically uses "axisymmetric geometric shapes, said geometric shapes selected from cylinders, cones, toroids, spheres, parallelepipeds, ellipsoids, and polyhedrons". According to "The American Heritage Dictionary," Second College Edition, 1985, Houghton Mifflin Company, 'shape' is defined as: "The characteristic surface configuration of a thing; form" or "Something distinguished from its surroundings by its outline". Carr et al. utilize basic, one-dimensional geometries to construct shapes while the method of the

present invention specifically uses shapes to provide a much more simple and efficient method for designing a primary geometry for a powder pressing application.

In particular, Carr et al. on page 10-114, 1<sup>st</sup> paragraph, states that "The parts of the simulation model are drawn to scale in the CAD component." and that "You can create vertices, lines, and arcs or use the primitive builder to construct geometric representations of the powder and tooling." At the end of the paragraph, Carr et al. note that "In most cases, recreating the tooling and powder fill shapes in the CAD component is faster and easier than adapting a complicated, imported drawing." Therefore, in the method described by Carr et al., the user must create the shapes used in the simulation model. The method of Carr et al. does provide the means to create "vertices, lines, and arc" but these are not shapes as Carr et al. themselves acknowledge by stating that the user must create the shapes using the vertices, lines, and arcs. Nowhere do Carr et al. claim that their simulation tool has available axisymmetric geometric shapes as described in Claims 1-7, 10, 12-13, and 15-17 of the instant invention with which a user can easily describe the primary geometry of a component to be formed by powder pressing.

Additionally, as noted by Carr et al., page 10-117, the program described therein supports two different means of creating a finite element mesh, both requires significant user input (as noted in Applicant's 1.132 Declaration, attached), sometimes resulting in meshes of poor quality. In the method of the present invention, as specified in amended claim 1, the predefined geometric shapes are automatically meshed through internal computer software into a finite element mesh with little user input. As also noted in Applicant's 1.132 Declaration, the method of the present invention does not require the simulation user to have expertise in finite element modeling and significantly reduces the time to prepare the simulation. The user responds to on-screen line queries to quickly and easily construct the mesh for the FE simulation. All of the features that are needed to successfully run a compaction simulation are already in the software (e.g., including the requirement of generating finer meshes around sharp radius features), so it is impossible to "miss" anything critical. Furthermore, the simple guidelines provided help the user define

the appropriate coarseness of the mesh to complete an accurate simulation quickly. As such, no extensive expertise with meshing and/or meshing software is required. A non-expert can easily construct the mesh for a FE compaction simulation in minutes. Furthermore, the user can quickly and easily review the mesh, and even easily and quickly modify the mesh prior to complete a compaction simulation or a series of simulations (e.g., to quickly optimize a design).

As noted by the Applicants 1.132 Declaration, by using the modular approach of the present invention and eliminating the need to make many of the decisions necessary to set up a compaction simulation from scratch, the subject invention can be used by a non-expert in a manufacturing environment to complete accurate die compaction simulations quickly and easily (i.e., in minutes versus hours or days relative to the traditional approach described in prior art).

Therefore, Carr et al. in view of Applicants' own admissions as noted neither teach or suggest a method of generating a primary geometry using predefined axisymmetric geometric shapes, said geometric shapes selected from cylinders, cones, toroids, spheres, parallelepipeds, ellipsoids, and polyhedrons and transition radii where the geometry has a finite element mesh automatically prepared through interfaced software, with material properties and boundary conditions defined through a user interface and subsequent calculation and evaluation of the deformation characteristics of the geometry, as described in claims 1-7, 10, 12-13, and 15-17.

II. DISCUSSION (Rejection Under 35 USC 103(e), Carr et al. in view of Applicant's own admission, Specification, page 4, lines 3-4 and page 5, line 17, and further in view of Zipse, 1997.

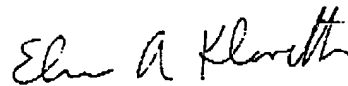
Zipse, 1997, describe a three-dimensional geometry. However, as discussed in Section I, Carr et al. in view of Applicant's own admission neither teach or suggest a method of generating a primary geometry using predefined geometric shapes and transition radii where the geometry has a finite element mesh automatically prepared through interfaced software, with material properties and boundary conditions

defined through a user interface and subsequent calculation and evaluation of the deformation characteristics of the geometry, as described in claim 1. Therefore, claim 8, being dependent on claim 1, is not taught or suggested by Carr et al. in view of Applicant's own admission and further in view of Zipse.

### CONCLUSION

Applicants have responded to each and every rejection raised by the Office and, in concurrence with the Office, consider that claims 1-8, 10, 12-13 and 15-17 are now in condition for allowance. Applicants request expeditious processing to issuance.

Respectfully submitted,



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